

Amendments to the Drawings

The attached drawing sheet includes a change to Fig. 4. The sheet includes only Fig. 4, the original of which it replaces. Per the objection made in the Office Action, this figure has been revised to include a depiction of the grounding of pin 13.

Attachments: Replacement Sheet
Annotated Sheet Showing Changes

REMARKS/ARGUMENTS**1. Drawings**

As noted above, Fig. 4 has been revised to include a depiction of the grounding of pin 13, per the objection made in the Office Action.

2. Specification

In the specification, paragraph [0021] has been amended to reference the branched bus (18') depicted in Fig. 2, and paragraph [0026] has been amended to reference the pins (21) depicted in Fig. 3. No new matter has been introduced.

Also per the objections in the Office Action, paragraph [0046] has been amended to eliminate the duplicate word, "been."

3. Claim Objections

Claims 2-15 and 18-20 were objected to for informalities. The present amendments address or render moot each of the objections. Except for the amendments narrowing the claimed subject matter to mining and blasting and electronic detonators used therein, these amendments do not affect the scope of the claims.

4. Claim Rejections - Prior Art

All claims stand rejected as anticipated by U.S. Patent No. 6,166,452 to Adams et al. ("Adams"), which is directed to an igniter for use in the gas generators of vehicle safety systems. In contrast, claims 1-11 have now been amended to add the limitation that the claimed apparatus is "an electronic detonator for use in mining or blasting," and claims 12-15 and 16-20 have been amended correspondingly. Claim 8 is canceled and new claim 21 added.

Although the first paragraph of the background of Adams states that "It would also be advantageous to have similar capabilities for selectively igniting various units of reactive materials [simultaneously or sequentially depending upon selected variables], such as explosives, in mining or demolition operations" (col. 1, lines 23-26), it is clear that this statement is nothing more than a general and tangential background comment that has nothing to do with the actual invention disclosed. To the contrary, the entirety of the disclosure of the invention is directed solely to an igniter specifically for use in vehicle safety systems, and it does not remotely connect the quoted background comment with the actual disclosure of invention. Even if the quoted comment were reasonably connected in some way to the disclosure of the invention (which it is not), it would still be at best no more than a wishful statement of a goal or objective for which no solution is reasonably taught or suggested, because there is no disclosure as to how the disclosed igniter could be modified for use with detonators used in mining or blasting. Instead, in the closing remarks concerning the breadth of possible applications for the invention, Adams states that "It is understood that the gas generator shown in Figs. 8 and 9 is merely exemplary and that the igniter of the present invention may be used with any gas generator design, and that a single gas generator device may be assembled with more than one igniter of the present invention. It is understood that the igniters of the present invention may also be used with hybrid airbag inflators." (Col. 7, lines 2-8 (emphasis added)).

Further support for Adams' lack of inherent disclosure of an electronic detonator as claimed, and its lack of suitability for modifying a prior art detonator reference to render the claimed electronic detonator obvious, is contained in the Declaration of Abrar A. Tirmizi, which was

originally submitted in Assignee's co-pending application S.N. 10/158,529 and a copy of which is now submitted herewith in support of the present amendment and remarks:

Persons of ordinary skill in the detonator art would not have, at the time of the invention of this application, considered or referred to technology in the automotive initiator field to address problems in or modify the designs of, detonators. To the contrary, technical conferences in the detonator field are separate from, and do not overlap with, technical conferences in the automotive initiator field. Similarly, those skilled in the design and manufacture of initiators would generally not have a background in mining or the pyrotechnic products used therein. The technical issues are quite different, and automotive initiators are not pertinent to the problems involved in detonator design. The design of electronic detonators is approached completely differently, and involves vastly different considerations. One reason for the difference in design strategies between detonators and automotive initiators is that in detonator systems, all detonators are intended to deploy – every single one on the system – in response to a single signal; in contrast, only one or a selected small number of initiators are intended to deploy in response to a signal. Another reason for the difference is that, on the other hand, the manufacture and assembly of the structural and pyrotechnic components of detonators is in general more “low-tech” and often relies upon hand-assembly, whereas initiator manufacture tends to be highly automated and focuses intensively on extremely high reliability.

Tirmizi Decl., ¶3. Explanation as to why there was further no reasonable suggestion or motivation at the time of the present invention to modify the teachings of a prior art detonator reference by attempting to incorporate therein the igniter taught by Adams is as follows:

[P]roviding a hermetically sealed initiator in a conventional fashion requires circumferential welds. To fit in a standard detonator shell, however, an ignition element must have a significantly smaller diameter than automotive initiators, resulting in a significantly higher surface to volume ratio and concomitantly reduced heat-sink for the heat generated by welding, presenting a

well-known impediment to the welding of such devices. Further, reducing the header of Bailey proportionally results in problems of insulator glass-cracking during welding. ...

Tirmizi Decl., ¶4.

Favorable action on this application is thus respectfully requested in view of the foregoing amendments and evidence.

Respectfully submitted,

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THOMAS J. BRINDISI
Reg. No. 40,348

20 28th Place, Suite B
Venice, California 90291
Tel. (310) 439-2901
Fax. (310) 439-2902
Cel. (213) 716-4370

Attachments: Replacement & Annotated Drawing Sheets; Declaration